

2021 Wyoming Wattsmart Business Program Evaluation

FINAL REPORT

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Introduction

This 2021 Wyoming Wattsmart Business program evaluation report presents the major evaluation findings and a discussion of the Cadmus team’s conclusions and recommendations. This report is intended to be viewed in conjunction with the Wyoming Wattsmart Business Evaluation Dashboard,¹ which provides further information on project-level results, trends, and historical performance.

Through its Wattsmart Business program, Rocky Mountain Power (RMP) offers services and incentives to help commercial, industrial, and irrigation customers maximize the energy efficiency of their equipment and operations through midstream (distributors/suppliers) and downstream (customer) incentive mechanisms.

RMP reported 2021 Wyoming Wattsmart Business program gross electricity savings of 30,281,577 kWh. RMP uses an outsourced delivery model for all demand-side management (DSM) services, and contracted with two program administrators—Cascade Energy and Resource Innovations—to implement all program offerings.

RMP contracted with the Cadmus team (comprising Cadmus and VuPoint Research) to conduct impact and process evaluations of the 2021 Wyoming Wattsmart Business program. At RMP’s request, we evaluated program effectiveness and reported the 2021 evaluation findings.

The Cadmus team evaluated three types of 2021 offerings:

- **Typical Upgrades and Custom Analysis:** RMP offered prescriptive incentives (typical upgrades) for measures such as agricultural, compressed air, HVAC, lighting, motors, building shell, food service equipment, and irrigation. RMP also offered custom incentives (custom analysis) for verified first-year energy savings resulting from the installation of qualifying capital equipment upgrades not covered by Typical Upgrades incentives or other Wattsmart Business program offerings.
- **Lighting Instant Incentive (midstream):** Through this offering, RMP targeted the lighting maintenance market by providing customers with instant point-of-purchase incentives on qualified LEDs, occupancy sensors, and retrofit kits purchased through a participating lighting distributor. Customers who purchased through a nonparticipating distributor did not receive an instant discount, but could apply to RMP for incentives after the purchase.
- **Energy Management:** RMP provided expertise and custom incentives for verified savings achieved through improved operations, including maintenance and management practices. If eligible, customers could receive incentives for capital improvements through the other Wattsmart Business program offerings.

¹ The Wyoming Wattsmart Business Evaluation Dashboard is available on the website: <https://www.pacificorp.com/environment/demand-side-management.html>

Evaluation Objectives

Table 1 lists the study objectives and evaluation activities.

Table 1. Evaluation Objectives and Activities

Rocky Mountain Power Evaluation Objectives	Participant Survey	Partial Participant Survey	Nonparticipant Surveys	Trade Ally Interviews	Desk Review	Phone Verification	Net-to-Gross Analysis	Cost-Effectiveness Analysis	Reporting
Document and measure program effects	✓	✓		✓	✓	✓	✓		
Verify installation and savings	✓				✓	✓	✓		
Evaluate the program’s process and the effectiveness of delivery and efficiency	✓	✓	✓	✓					
Understand the motivations of participants, nonparticipants, and trade allies ^a	✓	✓	✓	✓					
Provide data support for program cost-effectiveness assessments	✓				✓	✓	✓	✓	
Identify areas for potential improvements	✓	✓	✓	✓	✓	✓	✓	✓	✓
Document compliance with regulatory requirements									✓

Methods

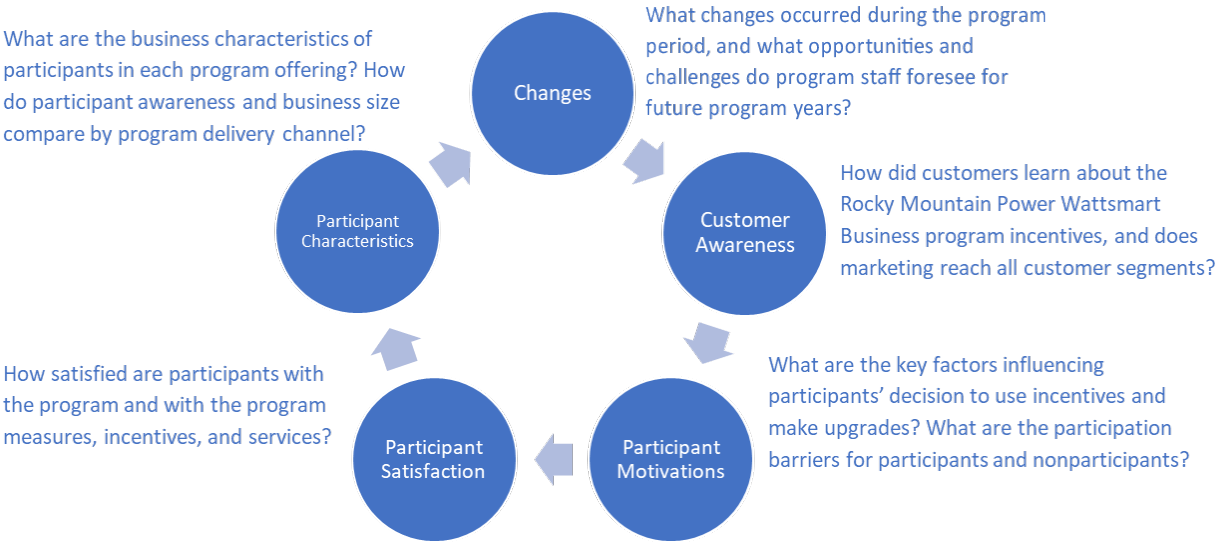
To evaluate energy impacts, the Cadmus team used desk reviews, phone verification, and surveys to inform the engineering analyses, net-to-gross (NTG) analysis, and program cost-effectiveness analysis. Table 2 summarizes these activities.

Table 2. Impact Steps to Determine Evaluated Gross and Net Savings

Savings Estimate	Step	Action
Evaluated Gross Savings	1	Tracking Database Review: Validate the accuracy of data in the participant database and verify that savings match annual reports
	2	Verification: Adjust gross savings based on actual installation rates
	3	Unit Energy Savings: Validate saving calculations (through engineering review, analysis, and meter data)
	4	Realization Rates: Extrapolate realization rates to the population
Evaluated Net Savings	5	Attribution: Apply NTG adjustments

Figure 1 shows the research areas and questions addressed through the process evaluation. The Cadmus team relied on an online participant survey, telephone partial participant survey, and nonparticipant and trade ally interviews to assess program delivery and efficacy, bottlenecks, barriers, and opportunities for improvements.

Figure 1. Process Evaluation Research Areas and Questions



Evaluation Findings

This chapter includes detailed findings of the impact evaluation, NTG analysis, process evaluation, and cost-effectiveness analysis for the Wyoming Wattsmart Business program.

Impact Evaluation

To determine gross savings, the Cadmus team conducted verification and engineering analyses on a sample of 2021 projects (see *Appendix A. Gross Engineering Analysis Methodology* for information on the impact evaluation methodology). To calculate net savings, the Cadmus team conducted a survey of participants to inform freeridership and spillover and a survey of nonparticipating businesses to inform nonparticipant spillover. Please see the Evaluation Dashboard for additional detail on project-level results and findings across several years.

Impact Sampling

Table 3 shows total projects, total projects sampled, the sample distribution, associated energy savings, and the sample’s percentage of the savings. Out of 600 total projects, the Cadmus team analyzed 48 projects, which contributed 33% of the 2021 program savings.

Table 3. Wyoming 2021 Wattsmart Business Program Impact Sampling Summary

Strata	Projects	Total Reported Savings (kWh)	Unique Sampled Projects		Sample Reported Savings (kWh)	Percentage of Reported Savings Sampled
			Random	Selected		
Energy Management	6	2,661,643	5	1	2,661,643	100%
HVAC	28	3,590,041	8	0	1,549,043	43%
Lighting	457	5,171,291	10	0	108,551	2%
Motors	41	4,000,943	8	1	2,904,498	73%
Oil and Gas	43	13,710,651	8	0	2,225,007	16%
Other	25	1,147,008	7	0	455,041	40%
Total	600	30,281,577	46	2	9,903,783	33%

Table 4 lists the evaluation findings, including number of projects, gross savings, precision, and net savings. Overall, the Wattsmart Business program achieved a 96.5% gross realization rate for the program year, though some variability occurred between measure categories. The impact evaluation achieved ±4.0% precision with 90% confidence overall. The Cadmus team calculated a NTG of 86.8%, yielding evaluated net savings of 25,366,710 kWh. The *Measure Strata Findings* section describes specific details and findings per strata.

Table 4. 2021 Wattsmart Business Program Savings

Strata	Projects	Reported Savings (kWh)	Evaluated Gross Savings (kWh)	Gross Realization Rate	Precision ^a	NTG	Evaluated Net Savings (kWh)
Energy Management	6	2,661,643	2,604,512	97.9%	0.0%	75%	1,953,384
HVAC	28	3,590,041	2,634,379	73.4%	21.5%	50%	1,317,190
Lighting	457	5,171,291	5,702,587	110.3%	12.2%	67%	3,820,733
Motors	41	4,000,943	3,950,146	98.7%	0.7%	100%	3,950,146
Oil and Gas	43	13,710,651	13,709,295	100.0%	0.0%	100%	13,709,295
Other	25	1,147,008	615,962	53.7%	59.1%	100%	615,962
Total ^b	600	30,281,577	29,216,881	96.5%	4.0%	86.8%	25,366,710

^a The measure category precision is based on 80% confidence, while the portfolio precision is based on 90% confidence.

^b Totals in this table may not sum due to rounding.

Measure Strata Findings

The following sections provide a high-level summary of the findings in each measure strata. RMP defines a measure as a specific measure type within a category. For example, one lighting project may have three different lighting measures, such as high-bay, linear LEDs, and wall sconces. Within each of these three measure types, there will be several unit counts. The Cadmus team mapped the measure categories within RMP’s measure database to strata used in the evaluation. Table 5 outlines the measure mapping strategy.

Table 5. Measure Mapping

Evaluation Strata	Measure Category	Program Name	Projects
Energy Management	Energy Management	Wattsmart Business	6
HVAC	HVAC	Wattsmart Business	28
Lighting	Lighting	Direct Install	457
		Small Business Direct Install	
		Midstream Lighting	
		Wattsmart Business Intake	
Motors	Motors	Wattsmart Business	41
Oil and Gas	Oil and Gas	Wattsmart Business	43
Other	Additional Measures	Wattsmart Business	25
		Appliances	
		Building Shell	
		Compressed Air	
		Food Service Equipment	
		Irrigation	
		Wattsmart Business Intake	
Refrigeration	Wattsmart Business		
Total			600

Energy Management

During 2021, RMP provided incentives for six energy management projects and reported 2,661,643 kWh in energy savings, which accounted for 9% of all reported energy savings. The Cadmus team evaluated

these incentivized energy management projects and extrapolated results to the population for a realization rate of 97.9% for the energy management stratum. Three energy management projects involved recommissioning and three projects involved compressed air leak repairs. The recommissioning projects were appropriately documented and savings calculations matched best practices. For the compressed air measures, the Cadmus team evaluated savings based on air compressor performance specifications and the documented reduction in airflow. Two of these projects realized lower energy savings than reported when accounting for the project-specific Compressed Air & Gas Institute compressor specifications.

HVAC

RMP provided incentives for 28 HVAC projects and reported 3,590,041 kWh in energy savings, which accounted for 12% of all reported energy savings. The Cadmus team evaluated eight random projects and extrapolated results to the population for a realization rate of 73.4% for the HVAC stratum. Six of eight projects involved variable frequency drives (VFDs). Evaluated savings for these VFD projects deviated from reported savings. The Cadmus team evaluated VFDs based on the VFD measure outlined in the *Idaho Power Technical Reference Manual* (v2.2).² VFD savings are a function of the end-use load profile of HVAC fans and pumps. The Cadmus team found that five of the six evaluated VFD projects used a low hours of use and therefore had low associated realized energy savings.

Two sampled projects involved the installation of advanced rooftop controls (ARC) on packaged air-handling units. RMP reported deemed savings for ARC measures based on the air-handling unit cooling capacity. The Cadmus team evaluated ARC projects based on the Regional Technical Forum's (RTF) Advanced Rooftop Control measure³ and found lower savings for both sampled projects. RMP uses deemed savings for ARC projects with higher savings than those determined through the RTF's Advanced Rooftop Control measure.

Lighting

RMP provided incentives for 457 lighting projects and reported 5,171,291 kWh in energy savings, which accounted for 17% of all reported program energy savings. The Cadmus team evaluated 10 randomly sampled projects and extrapolated results to the population for a realization rate of 110.3% for the lighting stratum. Eight of the 10 sampled projects were implemented through the midstream lighting delivery channel. Calculations were not provided for these midstream lighting projects, so the Cadmus team evaluated savings based on the methodology outlined in the RTF's Midstream Lighting measure. We based the hours of use and waste heat factor on the building type identified in the customer application. The team determined the baseline fixture based on the manufacturer's recommended placement or we used the lumen equivalence method if the manufacturer literature did not define a

² ADM Associates. October 15, 2018. *Technical Reference Manual 2.2*. Prepared for Idaho Power Company. <https://docs.idahopower.com/pdfs/EnergyEfficiency/Reports/2018TRM.pdf>

³ Regional Technical Forum. Accessed January 2021. "UES Measures." <https://rtf.nwcouncil.org/measures>

replacement fixture. For the non-midstream sampled lighting projects, evaluated savings matched reported savings.

Motors

RMP provided incentives for 41 motors measures and reported 4,000,943 kWh in energy savings, which accounted for 13% of all reported energy savings. The Cadmus team evaluated nine sampled projects and extrapolated results to the population for a realization rate 98.7% for the motors stratum. Six of the nine sampled projects included green motor rewind measures. RMP used deemed savings based on the RTF's green motor rewind measure. However, the RTF updated the green motor rewind measure in 2017 and the savings values per motor are lower than in prior RTF measure versions. We used the 2017 RTF version (The latest version available. RMP used an older version.), which resulted in an average realization rate of 80% across the six measures. Three sampled projects involved VFDs on process motors; to calculate savings for these project, RMP used custom calculations and historical trend data. The Cadmus team found minimal discrepancies with these sampled VFD projects.

Oil and Gas

RMP provided incentives for 43 projects in the oil and gas stratum and reported 13,710,651 kWh in energy savings, which accounted for 45% of all RMP's reported energy savings. The Cadmus team evaluated eight randomly sampled projects and extrapolated results to the population for a realization rate of 100% for the oil and gas stratum. All eight projects involved the installation of electric submersible pumps with improved controls or water shutoff opportunities. The implementer used an identical calculation methodology and documentation processes for all eight projects. The implementer followed best practices to calculate and appropriately document savings with supporting trend data. All projects realized 100% of reported savings.

Other

RMP provided incentives for 25 measures in the "other" stratum category and reported 1,147,008 kWh in energy savings, which accounted for 4% of all reported energy savings. The Cadmus team evaluated seven randomly sampled projects (VFD air compressor, refrigerated display cases, irrigation pump VFD, anti-sweat heater controls, and high-efficiency windows) and extrapolated results to the population for a realization rate of 53.7% for the stratum. One project involving the installation of high-efficiency windows drove down the realization rate for this stratum. RMP was unable to provide any documentation of the high-efficiency windows, resulting in a 0% realization rate for the project (171,239 kWh in reported savings). Another sampled project involving anti-sweat heater controls for display cases realized 26% of reported savings. Reported calculations were not provided. The Cadmus team evaluated this project based on the RTF's Grocery Anti-Sweat Heater Controls measure and found lower savings than reported. We found minimal discrepancies in the remaining sampled projects, resulting in an average realization rate of 104% for these five projects.

Net-to-Gross

NTG estimates are a critical part of DSM program impact evaluations because they allow utilities to determine portions of gross energy savings that were influenced by and are attributable to their DSM

programs. The Cadmus team evaluated net savings by conducting a freeridership and spillover analysis using self-reported responses from participating and nonparticipating business customers. The evaluation included three NTG components:

- **Freeridership** refers to energy savings that would have occurred in absence of the program and results in a reduction to program savings.
- **Participant Spillover** refers to additional energy savings obtained by customers who invested in additional energy-efficient projects due to their program participation, for which they did not receive rebates or incentives. These savings are added to program savings.
- **Nonparticipant Spillover** refers to energy savings generated by customers who were motivated by information about energy efficiency provided by RMP, or by past RMP program participation, to invest in energy efficiency projects for which they did not receive an incentive. These savings are added to program savings.

We used self-report surveys from a combined analysis sample of 2020 and 2021 participants to estimate freeridership and participant spillover by measure strata for the 2021 program.⁴ The Cadmus team determined the percentage of nonparticipant spillover for the 2021 program based on responses to questions in the 2020 and 2021 general population survey of RMP businesses customers. See [§ Net-to-Gross Analysis Methodology](#) for more information on our NTG calculation methodology.

The Cadmus team used the following formula to determine the final NTG ratio for each measure strata:

$$\text{Net-to-gross ratio} = 100\% - \text{Freeridership Percentage} + \text{Participant Spillover Percentage} + \text{Nonparticipant Spillover Percentage}$$

Table 6 summarizes the NTG evaluation results, shown as NTG and evaluated gross savings by program-measure strata. The program achieved an 86.8% NTG overall.

Table 6. 2021 Wyoming Wattsmart Business Program Net-to-Gross Results

Strata	Measure Responses (n)			Freeridership	Participant Spillover	Nonparticipant Spillover	NTG	Evaluated Net Program Population Savings (kWh)
	2020	2021	2020/2021 Combined					
Energy Management	1	N/A	1	25%	0%	0%	75%	1,953,384
HVAC	0	1	1	50%	0%	0%	50%	1,317,190
Lighting	12	25	37	33% ^a	0%	0%	67%	3,820,733
Motors	1	N/A	1	0%	0%	0%	100%	3,950,146
Oil and Gas	1	N/A	1	0%	0%	0%	100%	13,709,295
Other	3	1	4	0% ^a	0%	0%	100%	615,962
Total	18	27	45	13.2%^b	0.0%^b	0.0%	86.8%	25,366,710

^a This is weighted by evaluated gross program savings.

^b This is weighted by evaluated gross program population savings.

⁴ The Cadmus team combined the 2020 and 2021 respondents into one analysis sample due to low number of participants and low number of survey responses. Cadmus did conduct a census of participants.

Process Evaluation

The Cadmus team used primary data collection from several groups involved in the Wattsmart Business program to capture insights about how the program is meeting its objectives and serving RMP customers, and where there may be opportunities to strengthen or expand the program.

Process Sampling

The Cadmus team surveyed participants and partial participants and interviewed trade allies and nonparticipants for the 2021 evaluation, as shown in Table 7. Due to a small sample size, the following findings are based on a small number of completes and should be reviewed as qualitative rather than quantitative. Among the participant groups surveyed, the response rates were 23% for Typical Upgrades and Custom Analysis participants, 38% for Small Business Direct Install (SBDI) participants, 43% for Lighting Instant Incentives participants, and 15% for trade allies. Note that the number of responses may vary because not all respondents were asked each question due to survey branching and not all survey respondents provided responses to all questions.

Table 7. 2021 Wyoming Wattsmart Business Program Process Activity Sampling

Program Name/Measure Category	Sampling Frame ^a	Target Completes	Achieved Completes	
Agriculture	2	Census	1	
Compressed Air	1		0	
Custom	0		0	
Energy Management Retro-Commissioning	3		0	
Farm and Dairy	0		0	
HVAC	10		3	
Irrigation	3		1	
Lighting (other than SBDI or Lighting Instant Incentives)	54		13	
Other ^b	7		0	
Total Wattsmart Business Program	80			18
Small Business Direct Install	16			6
Lighting Instant Incentives	40			17
Trade Allies	13		2	2
Participant Subtotal	149	Census	45 ^c	
Partial Participant Subtotal	12	Census	6	
Nonparticipant Subtotal	10,343	Census	193	

^a The Cadmus team based the sampling frame on unique customers with contact information after removing duplicates.

^b "Other" includes appliances, building shell, food service, food service equipment, motors, oil and gas, and refrigeration.

^c This is the total completes across all programs and measures (Typical Upgrades and Custom Analysis participants, SBDI participants, Lighting Instant Incentives participants, and interviewed trade allies).

Participant Experience

Participants in the Wattsmart Business program answered survey questions about their entry into the program, how they navigated the process to identify projects and submit their applications, and their satisfaction with various program aspects. Program participants in 2021 included Typical Upgrades and

Custom Analysis participants (n=18), SBDI participants (n=6), Lighting Instant Incentives participants (n=17), and trade allies (n=2).

Typical Upgrades and Custom Analysis

The Cadmus team completed surveys with 18 participants, all from the Typical Upgrades component. Table 8 shows the breakdown of respondents by measure category.

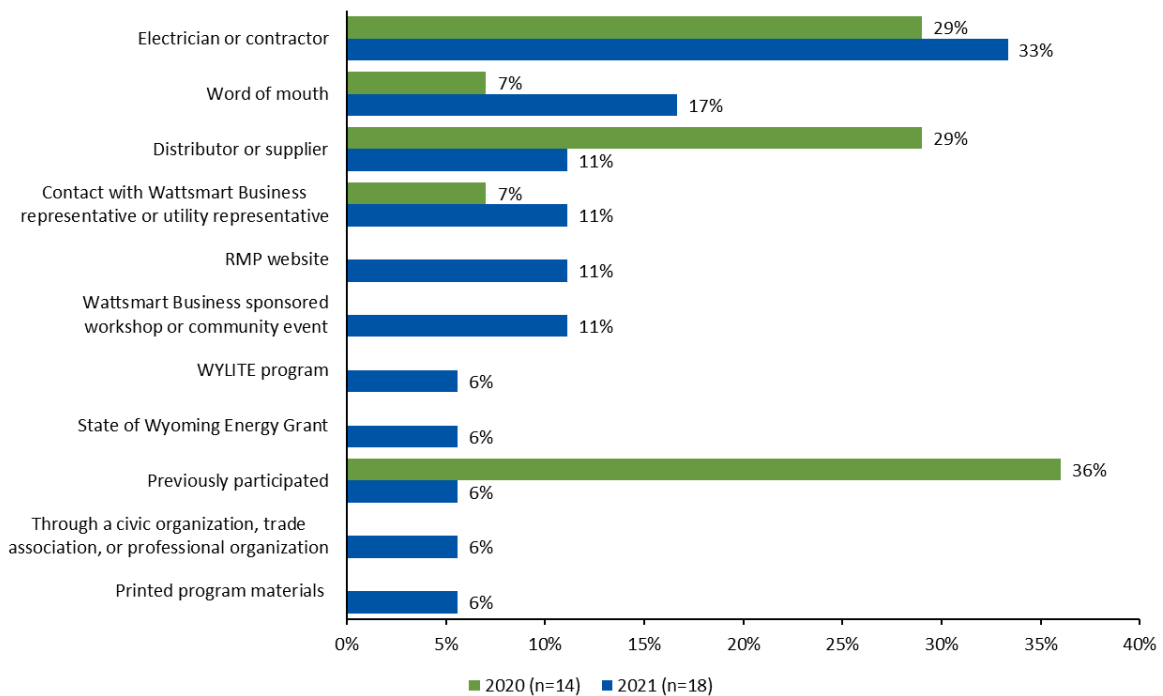
Table 8. 2021 Participant Survey Sample by Measure Category

Measure Category	Total
Agriculture	1
HVAC	3
Irrigation	1
Lighting	13
Total	18

Participant Experience

Respondents (n=18) reported that they most often learned about the available program incentives through their electrician or contractor (33%) or through word of mouth (17%). This differed from the 2020 responses, in which respondents most commonly learned about the available incentives through previous participation (36%), their electrician or contractor (29%), or their distributor or supplier (29%; n=14). Figure 2 shows the full results from 2020 and 2021 respondents.

Figure 2. Typical Upgrades and Custom Analysis Awareness Sources

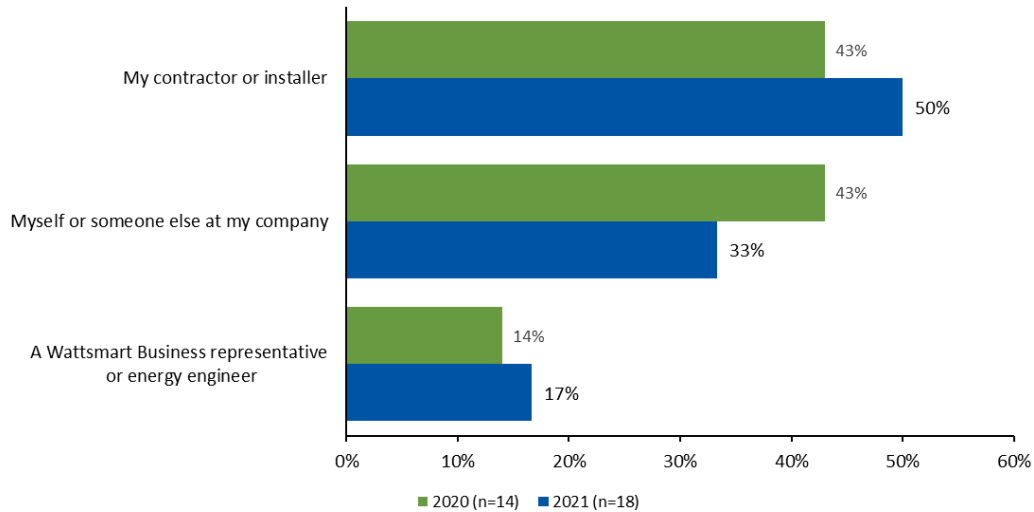


Source: RMP 2020-2021 Wattsmart Business Program Participant Survey Question A3. Multiple responses allowed. Don't know and refused responses removed.

Respondents who completed lighting projects (n=12) reported that, on average, the incentive they received covered 25% of their project cost, while respondents who completed non-lighting projects (n=5) reported that, on average, the incentive covered 6% of their project cost.

Regarding the application process, 50% of respondents reported that they or someone else at their company filled out their application for the program while 33% said their contractor or installer filled out the application. Figure 3 shows the response breakdown by category for 2020 and 2021.

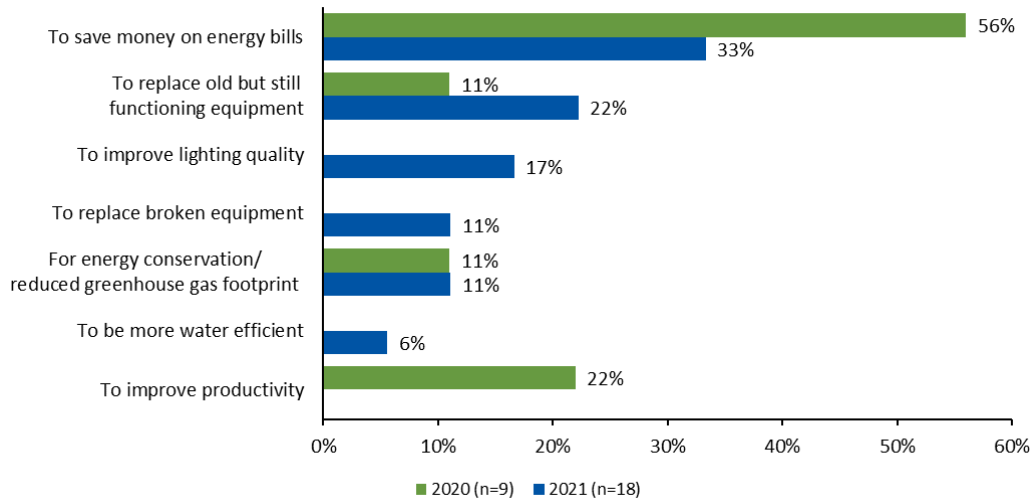
Figure 3. Who Completed the Application



Source: RMP 2020-2021 Wattsmart Business Program Participant Survey Question B2. Don't know and refused responses removed.

Additionally, the Cadmus team asked respondents (n=18) what the most important reason was for their company to participate in the program. As shown in Figure 4, 33% of the respondents reported that the most important reason was to save money on energy bills, followed by replacing old but still functioning equipment (22%), and to improve the lighting quality (17%). These results are consistent with the 2020 results, when saving money on energy bills was most commonly reported as the most important reason for participation (56%).

Figure 4. Most Important Reason for Participation

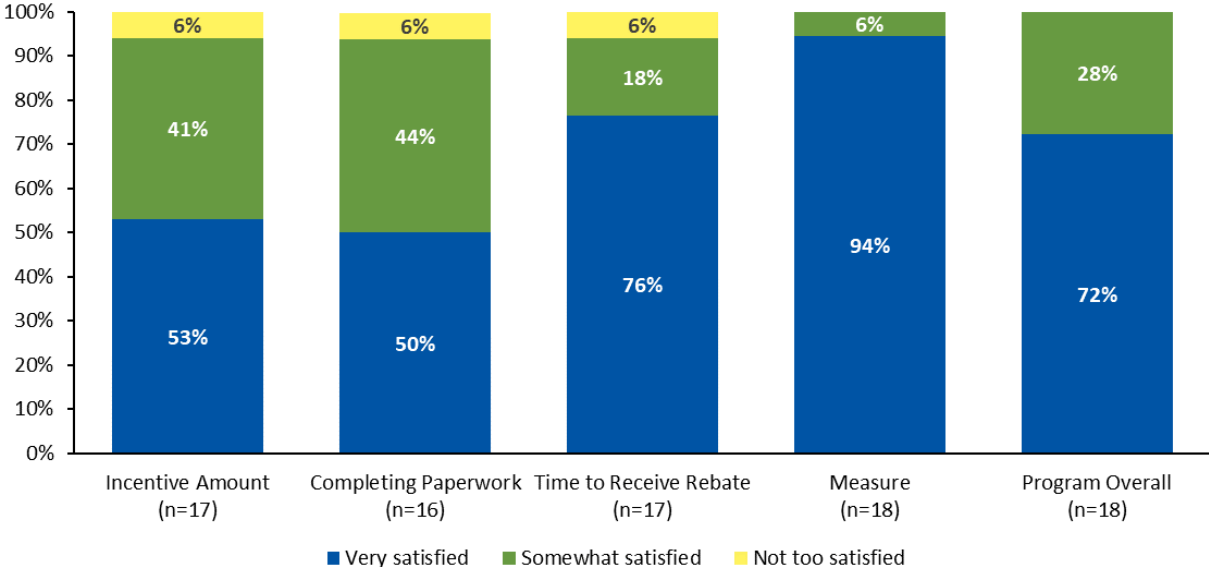


Source: RMP 2020-2021 Wattsmart Business Program Participant Survey Question B1. Don't know and refused responses removed.

Participant Satisfaction

As shown in Figure 5, respondents reported high levels of satisfaction. Most respondents reported that they were either *very satisfied* or *somewhat satisfied* with the incentive amount (94%; n=17), completing the paperwork (94%; n=16), and the time it took to receive the rebate (94%; n=17). Those who rated themselves as *not too satisfied* with the time it took to receive the rebate indicated that two to four weeks would be acceptable time frame from when they submit their application to when they receive the incentive (n=3). These results were comparable with those from 2020, when 100% of participants rated themselves as either *very satisfied* or *somewhat satisfied* with the incentive amount (n=14) and completing the paperwork (n=10), while 85% of respondents rated themselves as either *very satisfied* or *somewhat satisfied* with the time it took to receive the rebate (n=14). Furthermore, all respondents rated themselves as either *very satisfied* or *somewhat satisfied* with the measure and with the program overall (n=18).

Figure 5. Satisfaction with Program Components

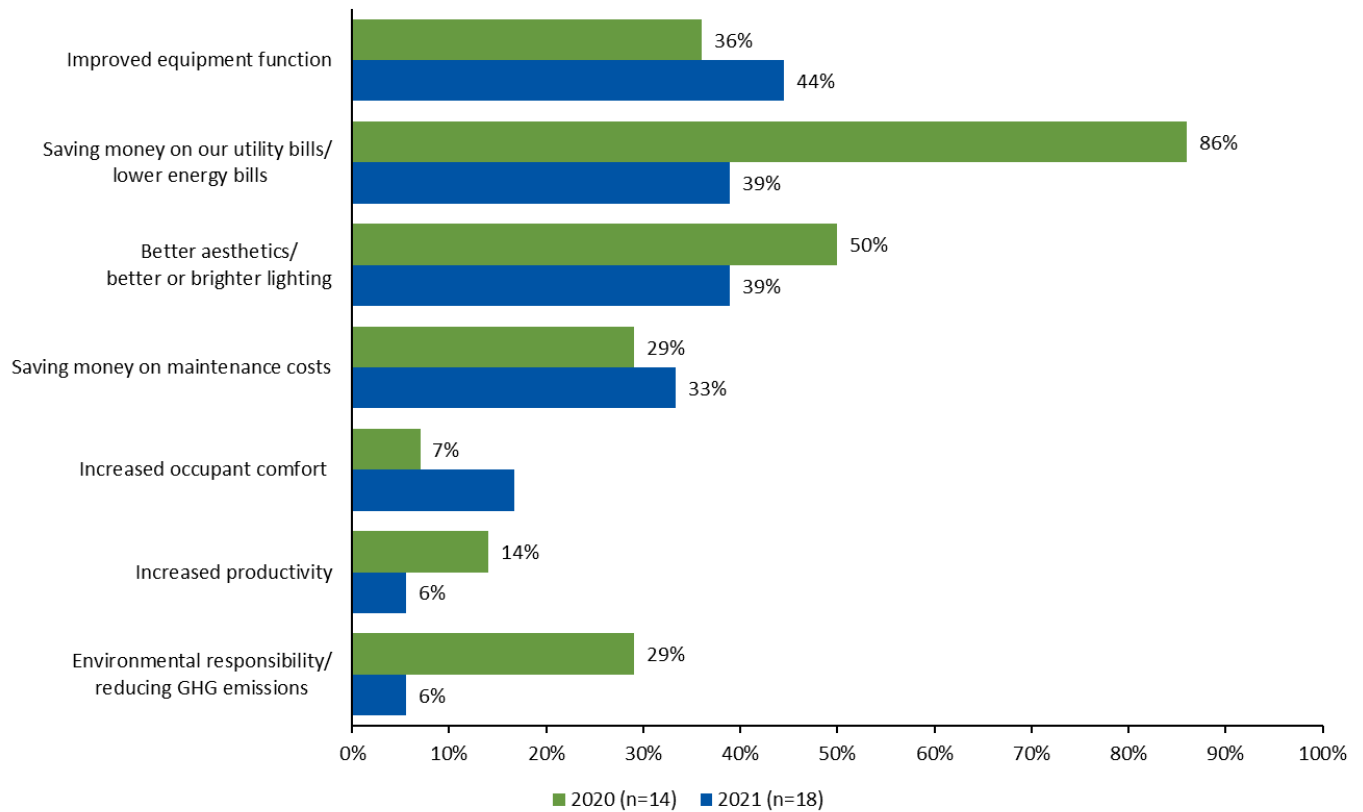


Source: RMP 2021 Wattsmart Business Program Participant Survey Questions B2, B4, B7, B12, and B15. Don't know and refused responses removed. Completing paperwork was asked on a scale of *very easy* to *not at all easy*.

Project Benefits

Respondents reported one or more benefits that their companies experienced from the project they completed. Respondents most commonly said that benefits included improved equipment function (44%), saving money on utility bills (39%), and better aesthetics (39%; n=18). In the 2020 results respondents most commonly reported the program benefits as saving money on utility bills (86%), better aesthetics (50%), and improved equipment function (36%; n=14). Figure 6 shows the complete breakdown of responses.

Figure 6. Project Benefits



Source: RMP 2020-2021 Wattsmart Business Program Participant Survey Question B14. Multiple responses allowed. Don't know and refused responses removed.

Firmographics

Eighty-eight percent of the respondents said their company owns the facility where the improvements were made, while 12% said they rent the facility (n=17). Respondents also reported on the number of employees at their company (n=17):

- Five said 1 to 10 people
- One said 11 to 25 people
- Three said 26 to 50 people
- Two said 51 to 75 people
- Four said 101 to 200 people
- One said 201 to 500 people
- One said more than 500 people

Respondents also identified the type of fuel source their facility uses for space and water heating. For space heating, 88% of respondents said their facility uses natural gas, 6% said they use electric sources, and 6% said they use another source (n=16). For water heating, 69% of respondents said their facility uses natural gas sources, 25% said they use electric, and 6% said they use another source (n=16).

Small Business Direct Install

The Cadmus team completed six surveys with SBDI participants. These surveys allowed us to explore participant experience, satisfaction with various program aspects, perceived benefits and challenges associated with participating, and firmographic information.

Participant Experience

Half the SBDI participants (n=3) learned about the available incentives or discounts through contact with a Wattsmart Business representative or RMP representative, while two respondents learned through an electrician or contractor and one respondent had previously participated and learned through word of mouth.

In terms of the most important reason their company decided to participate in the program, two respondents said saving money on energy bills, two said to improve lighting quality, and one respondent said to replace old but still functioning equipment (one respondent did not answer).

Five of the respondents reported that they received a detailed project proposal with estimated incentive and energy bill saving amounts after their free energy assessment. The sixth respondent did not know whether they had received a project proposal with estimated incentive and energy bill saving amounts. These respondents were then asked what information in the project proposal they considered to be the most influential in their company's decision to proceed with their project: three respondents said saving money on energy bills and energy savings and two said saving on project costs.

Participant Satisfaction

When asked about their satisfaction with different program aspects, including the ease of scheduling a facility assessment, the work provided by the contractor, the equipment provided by the contractor, the window time to enroll, and the program overall, all of the respondents were either *very satisfied* or *somewhat satisfied* (n=5).

Project Benefits and Challenges

All SBDI participants reported one or more benefits that their company experienced due to the equipment they installed.

- Four identified saving money on their utility bill as a benefit
- Three identified the incentive as a benefit
- Three identified better aesthetics as a benefit
- Two identified improved equipment function as a benefit
- One identified saving money on maintenance costs as a benefit
- One identified increased occupant comfort as a benefit

None of the respondents encountered any challenges while participating in the program (n=6). Furthermore, none of the respondents provided any recommendations to improve the SBDI offering.

Firmographics

Four respondents said their company owns the facility where the improvements were made, while two said they lease the facility (n=6). Additionally, all six respondents said their company employs between one and 10 people. Respondents also identified the type of fuel source their facility uses for space and water heating. For space heating, four respondents said their facility uses natural gas, one said they use electric sources, and one said they use another source (n=6). For water heating, all six respondents said they use electric sources.

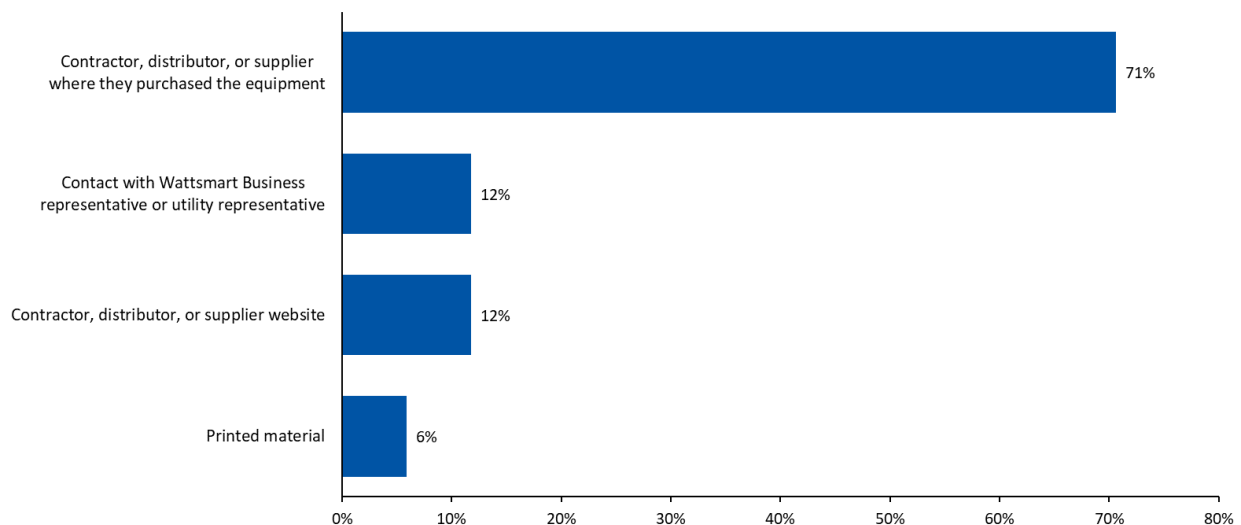
Lighting Instant Incentives

The Cadmus team completed surveys with 17 Lighting Instant Incentives participants to gather details about their program experience, satisfaction, and firmographic information.

Program Experience

As shown in Figure 7, respondents most commonly reported having learned about the available incentives through their contractor, distributor, or supplier (71%; n=17). Other sources of incentive awareness included a Wattsmart Business representative (12%); a contractor, distributor, or supplier website (12%); or through printed material (6%; n=17). In 2020, two of four respondents learned about the program incentives from their contractor, distributor, or lighting supplier.

Figure 7. Lighting Instant Incentives Awareness Sources



Source: RMP 2021 Wattsmart Business Program Participant Survey Question B1. Don't know and refused responses removed (n=17).

All respondents purchased their program equipment through a vendor they had worked with previously (n=17), which is consistent with the 2020 results (when all four respondents purchased their equipment through a vendor they had worked with previously). Half the respondents (50%) said they purchased from the vendor primarily because they offered the instant incentive (n=14).

Respondents shared what projects they were working on when purchasing the equipment (n=15):

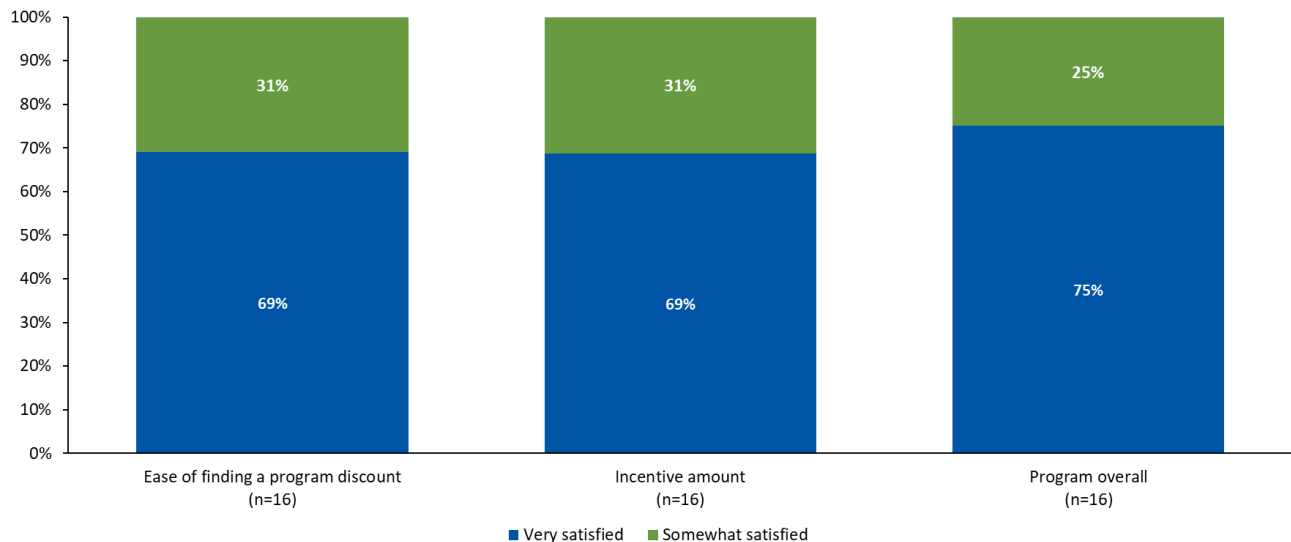
- Fifty-three percent were re-lamping an area of their facility as part of ongoing maintenance
- Twenty-seven percent were replacing burned out lamps
- Twenty percent were purchasing lamps for a larger lighting retrofit or new construction project

Program Satisfaction

The Lighting Instant Incentive participants rated how easy it was to find out about program incentives, as well as their satisfaction with the incentive amount and the program overall, as shown in Figure 8.

- **Finding a program incentive.** Sixty-nine percent of the 2021 respondents rated that it was *very easy* to find a program incentive for the equipment they wanted to purchase, and 31% rated this as *somewhat easy* (n=16). In 2020, 75% of respondents rated it as *very easy* to find the program discount for the equipment they wanted to purchase (n=4).
- **Incentive amount.** Sixty-nine percent of the 2021 respondents rated themselves as *very satisfied* with the incentive amount, while 31% rated themselves as *somewhat satisfied* (n=16). In 2020, 75% of respondents rated themselves as *very satisfied* with the incentive amount and 25% rated themselves as *somewhat satisfied* (n=4).
- **Program overall.** Seventy-five percent of the 2021 respondents rated themselves as *very satisfied* with the program overall and 25% rated themselves as *somewhat satisfied* (n=16). In 2020, 75% of respondents rated themselves as *very satisfied* with the Lighting Instant Incentives program offering overall, while 25% rated themselves as *somewhat satisfied* (n=4).

Figure 8. Lighting Instant Incentive Satisfaction



Source: RMP 2020-2021 Wattsmart Business Program Lighting Instant Incentives Participant Survey Questions B4, B7, and B9. Ease of findings a program discount was asked on a scale of *very easy* to *not at all easy*.

None of the respondents encountered any challenges while participating in the program (n=17), and only one respondent had an improvement suggestion (to increase the incentive amount).

Firmographics

Thirty-eight percent of the respondents said their company is in the construction industry, while 13% are in health care, 13% are in oil and gas, 6% are in the accommodation industry, 6% are in food services, 6% are in real estate or property management, 6% are in retail, 6% are in fitness, and 6% are in the warehouse or wholesale industry (n=16). Seventy-one percent of the respondents said their company owns the facility where the improvements were made (n=14). Sixty-two percent of the respondents said their company employs 1 to 10 people, 8% said 11 to 25 people, 15% said 26 to 50 people, and 15% said 100 to 200 people (n=13). Eighty-seven percent of respondents said natural gas space heating is used at the facility where the improvements were made, while 13% said electric space heating is used (n=15). Additionally, 54% of respondents said that natural gas water heating is used at the facility, while 46% said they use electric water heating (n=13).

Trade Allies

The Cadmus team interviewed two trade allies to gather insight regarding their participation experience including program awareness, the program’s impact on their business, their awareness of the small business efforts, their overall program satisfaction, and general company firmographics.

Trade Ally Experience

One respondent said that they were not sure how their company first learned about the Wattsmart Business program, while the other respondent learned about the program through the RMP website. Both trade allies chose to become an approved Wattsmart vendor because they wanted to offer the incentives to their customers.

When asked what percentage of the jobs they completed in 2021 were part of the program, one trade ally said that approximately 2% and the other said approximately 5%. However, when asked how their participation in the Wattsmart Business program has affected their business, one respondent said that it has had a positive effect due because any additional money they can give to their customers is beneficial, and the other trade ally said it has had a positive effect for some projects since the price of equipment can be expensive. Neither trade ally identified any barriers to working with the Wattsmart Business program.

The Cadmus team asked the trade allies about their awareness of the scorecards⁵ for approved vendors or of any other additional material provided to trade allies. One respondent was familiar with the scorecard and said they use it to interact with staff. Furthermore, although the online application portal was introduced, both trade allies said they submit paperwork through the program staff.

⁵ RMP introduced scorecards for approved vendors to keep track of their projects.

Satisfaction

When asked about their overall satisfaction with the Wattsmart Business program, both respondents rated themselves as *satisfied*.

Overall, both respondents said that Pacific Power is responsive to their needs and provides them with the information and support they need to be successful.

When asked what program aspects are particularly helpful, one respondent said the program staff are great and responsive on paperwork, while the other respondent said the process is simple and easy. Additionally, when asked what products that are not currently eligible might be a good fit for the program, one respondent said it would be helpful to have more information about LED controls, which can be difficult to understand. The second respondent did not identify any product that would be a good fit for the program.

Firmographics

One interviewed trade ally is the certified lighting specialist, and the other trade ally is a building envelope controls specialist. Both trade allies primarily serve commercial customers (one trade ally serves all the RMP areas in Wyoming, while the other works mostly in Natrona County). Both respondents said their company had less than 10 employees in 2021.

Partial Participants

The Cadmus team completed surveys with six partial participants: three who considered (or began) a lighting retrofit, two who considered (or began) an energy efficiency upgrade, and one who considered (or began) a clothes washer upgrade. Partial participants answered survey questions about their program awareness, participation motivation, perceived barriers, satisfaction, and firmographic information. A partial participant is defined as a customer who considered (or began) a general energy efficiency upgrade project but not complete the project or receive a program incentive.

Awareness

The responding partial participants provided a variety of responses for how their company learned about the Wattsmart Business program (n=5).

- Two respondents learned from an RMP email
- One respondent learned from a RMP representative
- One respondent learned from their contractor or vendor
- One respondent had previously participated in the program

Half the respondents (three of six) said their company had received a Wattsmart Business program incentive in the past. Two of these three respondents had received the incentive for completing a lighting project, while the third had completed a motors project.

Five of the six respondents said the best way for RMP to keep them informed about incentives for energy efficiency improvements is through utility mailings, emails, newsletters with bills, or bill inserts, while the fifth respondent said by posting on the RMP website.

Motivation and Barriers

Four of the six respondents reported that their company's most important motivating factor when making decisions about energy-efficient upgrades is saving money on energy bills. Additionally, four respondents rated themselves as either *very likely* or *somewhat likely* to request an incentive for a project in the next six months.

Half the respondents (three of six) said their company did not complete the project they initiated through the Wattsmart Business program, while the other three respondents said their company *did* complete the project. One of these respondents said their project ultimately did not qualify to receive an incentive; the other two did not provide additional information on why they did not receive an incentive. Of those who did not complete their projects, one respondent said the project was still under contract, while one respondent said the project was halted due to costs and one respondent said the project was stopped because it was too time consuming.

The Cadmus team also asked respondents about how the COVID-19 pandemic and related economic impacts had affected their company's investments in building and equipment improvements. Four of five respondents said their company was investing about the same amount as usual in building and equipment improvements, while one respondent's company was investing less than they had pre-pandemic.

Satisfaction

Three of six respondents rated themselves as *very satisfied* with the program overall, while two were *somewhat satisfied*. One respondent rated themselves as *not at all satisfied* with the program overall, saying they applied for the program incentive but never heard back. When asked what RMP could do to improve their program experience, five respondents did not have a suggestion, while one said that RMP could increase the selection of eligible equipment, increase the incentive amount, and simplify the application process.

Firmographics

Two respondents are from the dairy or agricultural industry; one is in the arts, entertainment, and recreation industry; one is in educational services; one is in real estate or property management; and one is in the transportation industry. Five of six respondents said that their company owns the facility where their business is located. Two respondents said their company employs 1 to 10 people, two said 11 to 25 people, and one said more than 500 people (n=5). Three respondents said their facility uses natural gas space heating, while one respondent's facility uses electric space heating and another uses propane (n=5). One respondent's facility uses natural gas water heating, one uses electric water heating, one uses both natural gas and electric water heating, and one uses propane (n=4).

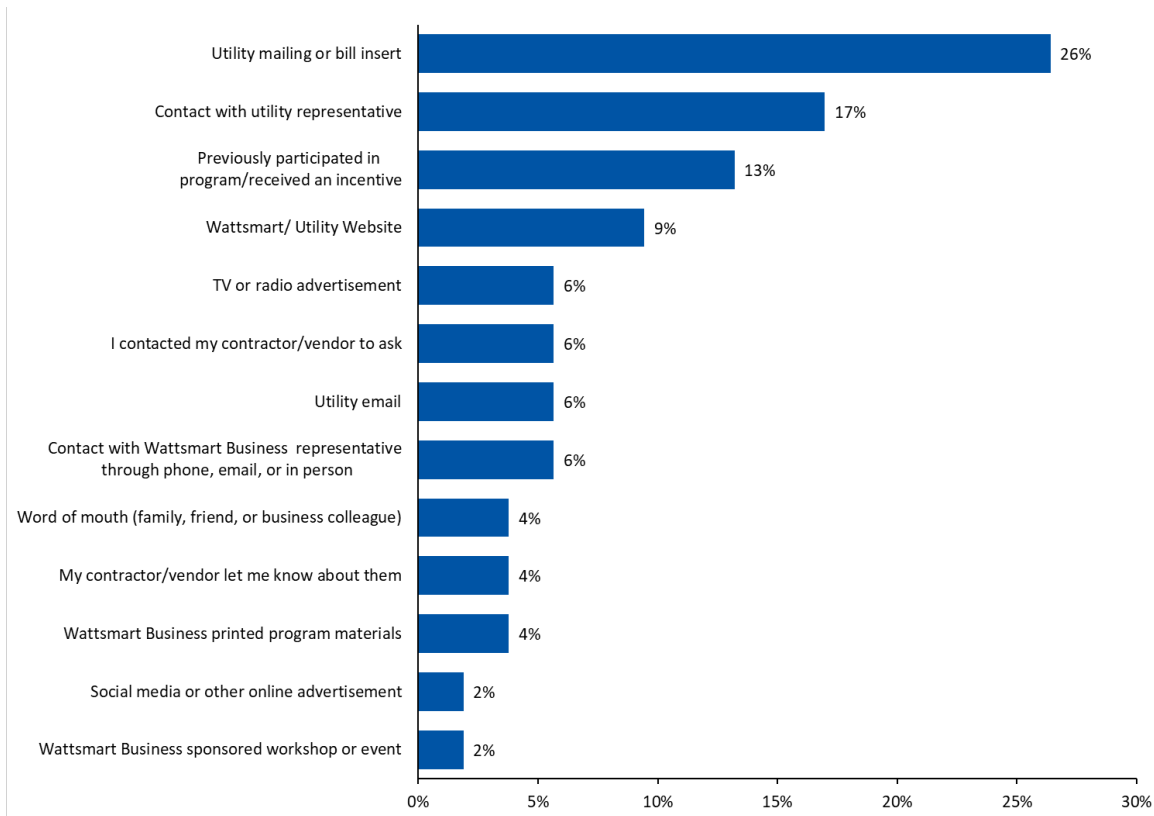
Nonparticipant Experience

The Cadmus team completed interviews with 193 nonparticipants to learn about program awareness, motivation and barriers to energy efficiency upgrades, and general firmographics.

Awareness

Prior to the interview, 31% of respondents said they were aware of the Wattsmart Business program offerings (n=193). Of those who were aware, 26% (n=53) said they learned about the program through a utility mailing or bill inserts. The full breakdown is shown in Figure 9.

Figure 9. Awareness Source for Nonparticipants



Source: Pacific Power 2020-2021 Wattsmart Business Program Nonparticipant Survey Question C3 (n=53).
Multiple responses allowed.

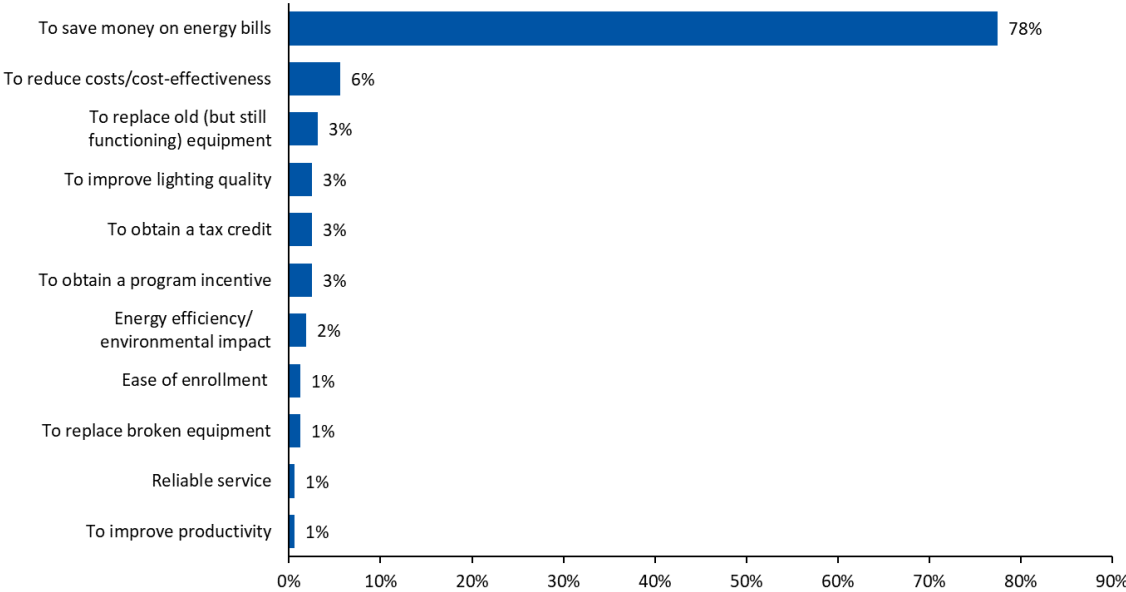
Of nonparticipants who were aware of the Wattsmart Business program offerings (n=53), 35% said their company had received a Wattsmart Business program incentive in the past. Additionally, 26% of these respondents said they were either *very likely* or *somewhat likely* to request the incentive in the future.

Furthermore, more than half of respondents (63%) said they did not participate in Wattsmart Business in the past two years because they do not know enough about the program (n=192). Ninety-two percent of respondents said the best way for RMP to keep them informed about incentives for energy-efficient improvements is through a utility mailing, email, newsletter with the bill, or bill insert (n=193). Other respondents said the best way to keep them informed is through contact with a Wattsmart Business representative, printed program materials, their electrician or contractor, or the vendor, distributor, or supplier where they purchase lighting.

Motivation and Barriers

As shown in Figure 10, 78% of respondents said the most important factor to motivate their company to make energy-efficient upgrades is to save money on energy bills (n=160).

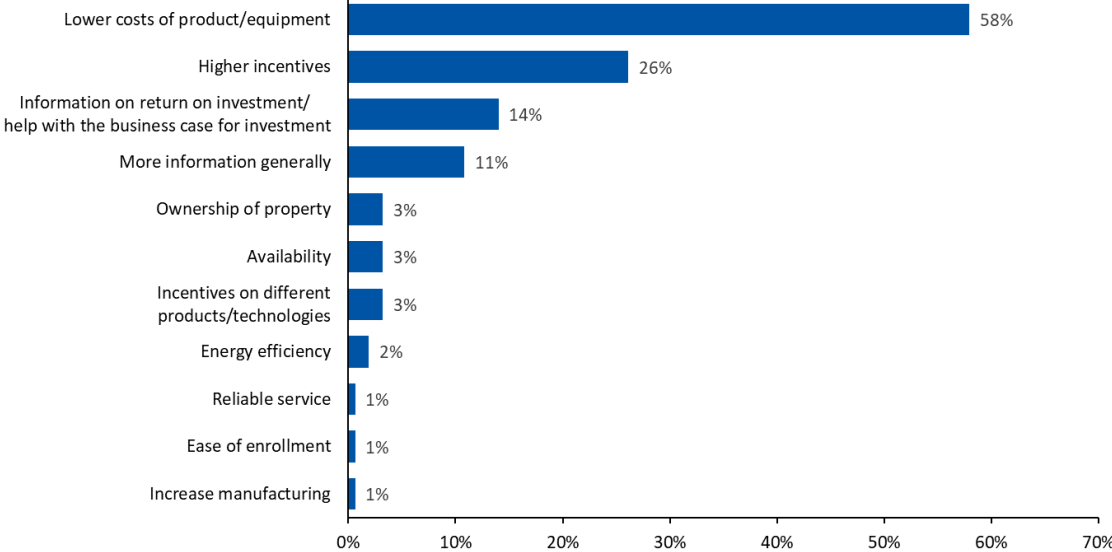
Figure 10. Most Motivating Reasons to Make Energy-Efficient Upgrades



Source: Pacific Power 2020-2021 Wattsmart Business Program Nonparticipant Survey Question D1 (n=160).

As shown in Figure 11, when asked what would motivate their business to make *more* energy-efficient purchases or upgrades, respondents most often cited ways to make upgrades more affordable such as lowering the cost of equipment or increasing incentives.

Figure 11. Most Motivating Reasons to Make More Energy-Efficient Purchases or Upgrades



Source: Pacific Power 2020-2021 Wattsmart Business Program Nonparticipant Survey Question D9 (n=157).

The Cadmus team also asked respondents about how the COVID-19 pandemic and related economic impacts had affected their company’s investments in building and equipment improvements (n=184):

- Fifty-seven percent said their company is investing about the **same** amount in building and equipment improvements as before the pandemic
- Thirty-four percent said their company is investing **less** in building and equipment improvements
- Nine percent said their company is investing **more** in buildings and equipment improvements

Firmographics

Sixty-nine percent of the respondents said their company employs 1 to 10 people, while 15% said 11 to 25 people, 7% said 26 to 50 people, and 9% have 51 or more people (n=183).

Cost-Effectiveness

As shown in Table 9, the Wattsmart Business program proved cost-effective for the 2021 evaluation period from the PacifiCorp Total Resource Cost (PTRC) test, with a benefit/cost ratio of 1.20, as well as from the Total Resource Cost (TRC) test (with a benefit/cost ratio of 1.09), the Utility Cost Test (UCT; with a benefit/cost ratio of 1.87), and the Participant Cost Test (PCT; with a benefit/cost ratio of 2.48). It was not cost-effective according to the Ratepayer Impact Measure (RIM) test perspective. Please see *Appendix C. Cost-Effectiveness Methodology* for more information on cost-effectiveness.

Table 9. 2021 Evaluated Net Wattsmart Business Program Cost-Effectiveness Summary

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PacifiCorp Total Resource Cost Test (TRC + 10% Conservation Adder)	\$0.0493	\$8,183,870	\$9,834,839	\$1,650,968	1.20
Total Resource Cost Test (TRC No Adder)	\$0.0493	\$8,183,870	\$8,940,763	\$756,892	1.09
Utility Cost Test	\$0.0288	\$4,773,902	\$8,940,763	\$4,166,861	1.87
Ratepayer Impact Measure Test	--	\$16,680,030	\$8,940,763	(\$7,739,267)	0.54
Participant Cost Test	--	\$6,406,653	\$15,858,031	\$9,451,378	2.48
Life Cycle Revenue Impacts (\$/kWh)					\$0.000113711
Discounted Participant Payback (years)					2.80

Conclusions and Recommendations

This section provides the Cadmus team's conclusions, along with key findings and associated recommendations.

RMP realized close to 100% of reported gross energy savings for four of the six sampled strata.

Evaluated savings for the energy management, lighting, motors, and oil and gas strata closely matched reported savings. These four strata account for 84% of all reported savings in 2021 and, when combined, exhibited a 101% realization rate.

The HVAC stratum realized 73.4% of reported savings. The HVAC sampled projects primarily involved incentivized VFDs and ARC measures. For VFDs, the deemed savings value used by RMP was higher on average than the combined results of the sampled VFD measures. VFDs installed on chilled water plants exhibited much lower runtimes than those installed on hot water pumps or fans. Because of the lower hours of use, fewer savings were realized.

For ARC measures, RMP reported savings using its in-house ARC Excel workbook. The Cadmus team evaluated these projects based on the RTF's Advanced Rooftop Control measure, using the air-handling unit system configuration, facility hours of operation, and primary fuel type. The team found lower ARC project savings than reported based on the RTF energy-savings calculation methodology.

Recommendation: Lower the deemed savings value for VFDs or use separate savings values that match the motor application as defined in the *Idaho Power Technical Reference Manual* (v.2.2). Update the in-house ARC Excel workbook to match the methodology and/or deemed savings values outlined in the RTF's Advanced Rooftop Control measure.

Saving money on energy bills continues to be a key motivation to program participation, although it's not the only motivator. Across Typical Upgrades and Custom Analysis participants, SBDI participants, and partial participants, respondents most commonly identified saving money on their energy bills as the most important reason for participating. Specific, among Typical Upgrades and Custom Analysis respondents, 33% said their key motivation for participating was to save money on energy bills (n=18). From the SBDI respondents who identified the important reason their company decided to participate in the program, two respondents said saving money on energy bills, two said to improve lighting quality, and one respondent said to replace old but still functioning equipment (n=5). Four of six partial participants said that the most important motivating factor was to save money on energy bills, while the other responses included obtaining program incentives and improving productivity as important motivating factors.

Saving money on energy bills is a motivating factor for nonparticipants. Most nonparticipants said that saving money on their energy bills is a motivating factor to making energy-efficient upgrades (78%; n=160), while also most commonly indicating that the lower costs of equipment are a motivating factor for making more energy-efficient purchases or upgrades (58%; n=157).

Customers were highly satisfied with program implementation. Typical Upgrades and Custom Analysis participants reported 100% satisfaction with the measure received and the program overall. Furthermore, most respondents rated themselves as either *very satisfied* or *somewhat satisfied* with the incentive amount (94%; n=17), completing the paperwork (94%; n=16), and the time it took to receive the rebate (94%; n=17). All SBDI respondents rated themselves as either *very satisfied* or *somewhat satisfied* with all the program aspects (n=5). Lighting Instant Incentive participants were also all either *very satisfied* or *somewhat satisfied* with the program and its aspects (n=16). The two interviewed trade allies were both satisfied with the program.

Although the Wattsmart Business program reaches customers through a variety of sources, there are still opportunities to expand customer awareness. Thirty-three percent of the Typical Upgrades and Custom Analysis respondents learned about the program offerings through their electrician or contractor, while 17% learned through word of mouth and 11% learned from their distributor or supplier (n=18). Similarly, SBDI participants learned about the Wattsmart Business incentives through contact with a Wattsmart Business representative, their electrician or contractor, or through previous participation. Additionally, most of the Lighting Instant Incentive participants learned about the program through a contractor, distributor, or supplier where they purchased the equipment (71%; n=17). However, of the 31% of nonparticipants who were aware of the program, 26% learned about the incentives through a utility mailing or bill insert (n=53), while 69% of nonparticipants were unaware of the program (n=193).

Recommendation: Explore methods to expand outreach to currently unengaged and unaware customers such as targeted outreach bill inserts and utility mailing, utility representatives and developing program champion contractors who become program advocates within their companies and to their customers.

The 2021 Wyoming Wattsmart Business program was cost-effective, achieving a PTRC benefit/cost ratio of 1.20. Under the PTRC test perspective, the program generated more benefits (\$9,834,839) than costs (\$8,183,870), producing positive net benefits. The program was also cost-effective according to the TRC, PCT, and UCT perspectives. In 2020, the Wattsmart Business program achieved a PTRC benefit/cost ratio of 1.20. In 2019, the program achieved a PTRC benefit/cost ratio of 0.80, and in the 2018 and 2019 program cycle achieved a combined PTRC benefit/cost ratio of 1.03. The program generated less energy savings in 2021 than in 2020 but achieved nearly identical overall benefits since the costs did not appreciably change year over year.

Gross Engineering Analysis Methodology

To conduct an impact evaluation of the Wattsmart Business program, the Cadmus team conducted several activities:

- Customer interviews
- Engineering analysis
- Site-level billing analysis

This section addresses reported gross evaluated savings. Reported gross savings are electricity savings (in kilowatt-hours) that RMP reported in its *Rocky Mountain Power Energy Efficiency and Peak Reduction Annual Reports* (annual reports).⁶ Gross evaluated savings are the savings achieved after engineering analysis. Net savings are program savings, net of what would have occurred in the program’s absence. These savings provide observed impacts attributable to the program.

To determine evaluated gross savings, the Cadmus team applied Steps 1 through 4, as shown in Table A-1. To determine evaluated net savings, the team applied the fifth step (discussed in *Appendix B. Net-to-Gross Analysis Methodology*).

Table A-1. Impact Steps to Determine Evaluated Gross and Net Savings

Savings Estimate	Step	Action
Evaluated Gross Savings	1	Tracking Database Review: Validate the accuracy of data in the participant database and verify that savings match annual reports
	2	Verification: Adjust gross savings based on actual installation rates
	3	Unit Energy Savings: Validate saving calculations (through engineering review, analysis, and meter data)
	4	Realization Rates: Extrapolate realization rates to the population
Evaluated Net Savings	5	Attribution: Apply net-to-gross adjustments

Step 1: To verify the accuracy of data in the participant database, the Cadmus team reviewed the program tracking database to ensure that participants and reported savings matched annual reports.

Step 2: The team selected a sample of sites from the RMP program database then stratified the distribution of measures among sampled sites, primarily by end-use type. The team evaluated sampled projects as part of the program evaluation using phone interviews and customer-provided photos and site documentation to verify measure installations.

Step 3: The team reviewed all project documentation; developed an evaluation, measurement, and verification plan; and, in a few instances, performed virtual site assessments to verify the installation, specifications, and operations of incented measures. The team also collected trend data for nine projects to document historical performance.

⁶ These reports are available online: <https://www.pacificorp.com/environment/demand-side-management.html>

Step 4: The team reviewed measure savings assumptions, equations, and inputs, which included conducting a billing analysis for selected measures. For complicated or custom measures, the team conducted an engineering analysis using the appropriate measurement and verification options in the *International Performance Measurement and Verification Protocol*.⁷ The team used interviews and other operational data to determine hours of use or power consumption for metered equipment types. In some instances, customers provided trend data from their building management systems, which the team used to determine equipment load profiles, hours of use, and performance characteristics.

Step 5: The team used the participant survey to calculate freeridership using an industry-standard self-report methodology. In addition, the team surveyed nonparticipants to determine if nonparticipant spillover could be credited to the program (for projects that were otherwise not provided with incentives).

Project Review

The Cadmus team reviewed all project documentation available from RMP. This documentation included project applications, equipment invoices, reports published by the pre-contracted group of energy engineering consultants, and savings calculation spreadsheets.

The Cadmus team performed several tasks for each site:

- Reviewed the reported documentation to verify that the quantity and specifications of equipment receiving incentives matched the associated reported energy-savings calculations and confirmed that installed equipment met program eligibility requirements
- Performed a detailed review of site project files to collect additional data necessary for each site savings analyses
- Where applicable, conducted a phone interview with facility personnel to gather information such as equipment types replaced and hours of operation

Engineering Analysis

In general, the Cadmus team referenced current measure workbooks and saving estimation methodologies from the *Idaho Power Technical Reference Manual (v2.2)* and the RTF. The *Idaho Power Technical Reference Manual (v2.2)* was updated in 2018 and relies on sources such as the *Database for Energy Efficiency Resources* and sources from the Northwest Power and Conservation Council, Northwest Energy Efficiency Alliance, Energy Trust of Oregon, Bonneville Power Administration, third-party consultants, and other regional utilities.

⁷ Efficiency Valuation Organization. January 2012. *International Performance Measurement and Verification Protocol, Concepts and Options for Determining Energy and Water Savings, Volume 1*. p. 25. EVO 10000 – 1:2012. <http://www.evo-world.org/>

Net-to-Gross Analysis Methodology

NTG estimates are a critical part of DSM program impact evaluations because they indicate the portions of gross energy savings that were influenced by and are attributable to DSM programs. The following sections describe the Cadmus team's NTG methodology for the Wattsmart Business program.

Overview

This section presents an overview of the Cadmus team's NTG methodology. To determine net savings, the team used a self-report approach and analyzed the collected survey data to estimate freeridership and spillover—this approach is typically considered the most cost-effective, transparent, and flexible method for estimating NTG and, consequently, is the NTG methodology most frequently employed in the industry.

$$\text{Net-to-gross ratio} = 100\% - \text{Freeridership Percentage} + \text{Participant Spillover Percentage} + \text{Nonparticipant Spillover Percentage}$$

Using self-reported responses, the Cadmus team estimated net savings by first assessing the program's influence on a participant's decision to implement an energy efficiency project and determining what would have occurred absent the program's intervention. This estimation includes examining the program's influence on three key characteristics of the project: its timing, its level of efficiency, and its scope (or size). This estimate represents the amount of gross savings that would have occurred without program intervention and is often referred to as freeridership.

The Cadmus team then estimated program influence on the broader market as a result of indirect effects of the program's activities. This estimate, often referred to as spillover, represents the amount of savings that occurred because of the program's intervention and influence but that is not currently claimed by the program. Spillover savings can be broken into two categories—participant and nonparticipant. Participant spillover savings occur directly (when program participants install additional energy-efficient equipment). Nonparticipant spillover savings occur when market allies who were influenced by the program install or influence nonparticipants to install energy-efficient equipment (such as when trade allies promote energy-efficient equipment to all customers as a result of the program training).

Freeridership Estimate

To determine freeridership, the Cadmus team presented respondents with a series of questions regarding their decision to install the equipment promoted by the program. The Cadmus team then scored the responses to these questions to determine the level of freeridership. A score of 1 indicates that the respondent is a complete freerider (that they would have installed the exact same equipment at the same time and in the same quantity without the program's assistance). A score of 0 (zero) indicates that the respondent is not a freerider (that without the program they either would not have installed any equipment within 12 months of when they did or they would have installed baseline efficient equipment).

As the first step in scoring freeridership, the Cadmus team reviewed the responses to determine if the exact same project (in terms of scope and efficiency level) would have occurred at the same time without the program. If so, we scored the respondent as a complete freerider. If not, the team reviewed the responses to determine whether the project would have occurred at all within the same 12-month period. If not, we scored the respondent as a nonfreerider. If the project would have occurred within the same 12-month period but was altered in respect to its size or efficiency level, we scored the respondent as a partial freerider. To assess the level of partial freeridership, the Cadmus team used the respondents' estimates of the percentage of the installed equipment that would have been high-efficiency equipment (the efficiency score) and the percentage of high-efficiency equipment that would have been installed within 12 months without the program (the quantity score). If the project would have occurred with some changes absent the program, the product of these two estimates is the initial freeridership ratio, as shown here:

$$\text{Initial Freeridership Ratio} = \text{Efficiency Score} \times \text{Quantity Score}$$

We then adjusted the initial freeridership score to account for the influence of prior program participation, which the respondent ranked on a scale of 1 to 5, with 5 meaning it was *extremely important*. Given RMP's efforts to cross-promote its entire portfolio of energy efficiency programs, a respondent's prior participation in a RMP program may have been influential in their decision to participate in the current program. Ideally, this influence would be attributed to the prior program as spillover savings since that program was responsible for the influence. However, given the portfolio-level marketing approach that RMP implements, respondents are unlikely to be able to identify the prior program by name. Therefore, the Cadmus team attributed the savings credit to the current program. To calculate this credit, the team reviewed the respondents' rating of the influence of the prior program. If the respondent rated previous participation as having an influence of 4 or 5, we reduced the respondent's adjusted freeridership by either 50% or 75%, respectively.

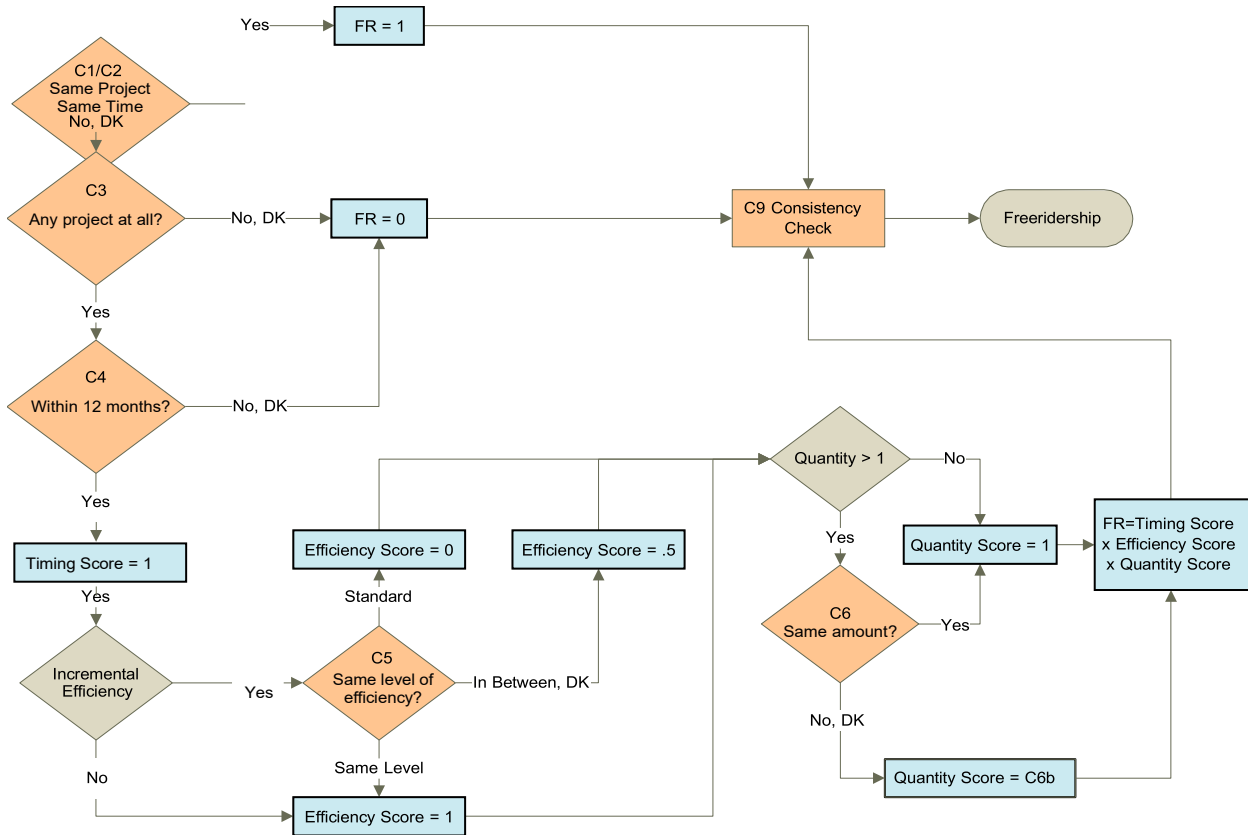
After adjusting the initial freeridership ratio for past program participation, the team reviewed a series of consistency check questions. These questions asked about the influence of the program's interventions (such as the financial incentives and technical assistance) and addressed the counterfactual (what would have happened without the program). For example, if the respondent rated the financial incentive as *extremely important* to their decision but said they would have installed the exact same equipment at the same time without the program, the Cadmus team asked the respondent to describe what impact the program had on their decision. During the scoring process, the team reviewed these responses to determine which scenario is correct and create an adjusted freeridership score. Table B-1 provides detailed scoring and descriptions of each question.

Table B-1. Wattsmart Freeridership Calculation Approach

Question	Question Text	Scoring
C1	Without the program, meaning without either the technical assistance or the financial incentive, would you have still completed the exact same [MEASURE] project?	None; qualifying question
C2	Without the program, meaning without either the technical assistance or the financial incentive, would you have still installed the [MEASURE] at the same time?	If C2=yes and C1=yes then freeridership=1
C3	Without the program, would you have installed any [MEASURE] equipment?	If C4=no, freeridership=0
C4	Without the program, in terms of timing, when would you have installed the [MEASURE]?	If not within 12 months of original purchase date, freeridership=0
C5	Relative to the energy efficiency of [MEASURE] installed through the program, how would you characterize the efficiency of equipment you would have installed without the program?	If high efficiency, efficiency score=1 If between high efficiency and baseline, efficiency score=0.5 If baseline efficiency, efficiency score=0
C6	Would you have installed more, less, or the same amount of [MEASURE] without the program?	If same or more, quantity score=1 If less, quantity score=percentage of equipment not installed
C9.6	On a scale from 1 to 5, with 1 being <i>not at all important</i> and 5 being <i>extremely important</i> , how important was each of the following factors in deciding which equipment to install: Previous participation with a RMP program	If C9.6=5, reduce adjusted freeridership by 75% If C9.6=4, reduce adjusted freeridership by 50%
C9.2	On a scale from 1 to 5, with 1 being <i>not at all important</i> and 5 being <i>extremely important</i> , how important was each of the following factors in deciding which equipment to install: Information provided by RMP on energy-saving opportunities	Consistency check
C9.4	On a scale from 1 to 5, with 1 being <i>not at all important</i> and 5 being <i>extremely important</i> , how important was each of the following factors in deciding which equipment to install: The RMP incentive or discount	Consistency check
C8	In your own words, can you please describe what impact the program had on your decision to complete these energy efficiency improvements for [MEASURE]?	Considered if 4 or 5 rating from C9.2 or C9.4 Reduce initial freeridership score by 50% if C8 response merits an adjustment

Figure B-1 shows the freeridership calculation approach.

Figure B-1. Freeridership Calculation Approach



Participant Spillover Estimate

Participant spillover occurs when a program influences participants to install additional energy-efficient equipment without a program incentive. The Cadmus team asked a sample of participants whether they completed any subsequent energy-saving projects and whether they received an incentive for that project. The team also asked these respondents to rate the relative importance of the Wattsmart Business program (and incentives) on their decision to pursue additional energy-efficient activities.

The analysis only included survey respondents who:

- Installed additional energy-savings measure(s) after participating in the Wattsmart Business program;
- Rated the program as highly important in their decision to install the additional measure(s); and
- Did not obtain a Wattsmart Business program incentive for the additional measure(s).

The Cadmus team used evaluated program savings as a proxy to estimate the savings associated with “like” spillover projects. Like spillover is associated with equipment that is similar to the equipment offered through the program. Table B-2 provides detailed scoring and descriptions of each like spillover question.

Table B-2. Wattsmart Participant Spillover Calculation Approach

Question	Question Text	Scoring
D8	Since participating in this program, have you purchased and installed any other energy efficiency improvements on your own without any assistance from a utility or other organization?	If no, potential spillover savings=0
D9	What type of equipment did you install?	N/A
D10.# Series	Measure-specific efficiency, capacity, and fuel-type questions	If responses indicated non-program qualifying unit, potential spillover savings=0
D10.b	How many [MEASURE] did you purchase and install?	Potential spillover savings=D10.b x program-evaluated per-unit savings
D11	Did you receive an incentive from RMP or another organization for this equipment?	If yes, potential spillover savings=0
D14	On a scale from 1 to 5, with 1 being <i>not at all important</i> and 5 being <i>extremely important</i> , please rate how important your experience with the [UTILITY] [CATEGORY] program was in your decision to install [this/these] energy-efficient product(s).	5 rating results in potential spillover savings attributed to program

As it has no comparative program savings data, “unlike” spillover can often be characterized only qualitatively. The Cadmus team asked detailed follow-up questions for unlike spillover responses that could be credited to the program as participant spillover if adequate information was provided to estimate savings by an engineer on the team.

The Cadmus team calculated the measure stratum-level spillover percentages by dividing the sum of additional spillover savings by the total incentivized gross savings achieved for all respondents in the measure stratum:

$$Spillover \% = \frac{\sum \text{Spillover Measure Energy Savings for All Measure Strata Respondents}}{\sum \text{Program Measure Energy Savings for All Measure Strata Respondents}}$$

Nonparticipant Spillover Estimate

Effective program marketing and outreach generates program participation and increases general energy efficiency awareness among customers. The cumulative effect of sustained utility program marketing can affect customers’ perceptions of their energy usage and, in some cases, may motivate customers to take efficiency actions outside of the utility program. This is generally called nonparticipant spillover, and it results in energy savings caused by, but not rebated through, a utility’s DSM activities.

To understand whether RMP’s general and program marketing efforts generated energy efficiency improvements outside the company’s incentive programs, the Cadmus team collected spillover data through a nonparticipant survey.

Using a 1 to 5 scale, with 1 meaning *not important at all* and 5 meaning *very important*, survey respondents rated the importance of several factors on their decisions to install energy-efficient equipment without receiving an incentive from RMP. The team used this question to determine whether RMP’s energy efficiency initiatives motivated energy-efficient purchases. Survey respondents addressed three factors:

- General information about energy efficiency provided by RMP

- Information from RMP program staff or contractors
- Past experience participating in a RMP energy efficiency program

The Cadmus team estimated nonparticipant spillover savings from respondents who rated any of the above factors as *very important* for any energy-efficient actions or installations reported. The team used estimated gross savings for the reported measures from the Wattsmart Business program evaluation activities.

Using the variables shown in Table B-3, the Cadmus team determined total nonparticipant spillover generated by RMP’s marketing and outreach efforts.

Table B-3. Wattsmart Nonparticipant Spillover Analysis Method

Variable	Metric	Source
A	Total Kilowatt-Hour Spillover Savings from Survey Respondents	Survey Data/Engineering Analysis
B	Total Nonparticipant Customers Surveyed	Survey Disposition
C	Sample Usage	RMP Customer Database
D	Sample Nonparticipant Spillover	$A \div C$
E	Total Population Usage Kilowatt-Hours	RMP Customer Database
F	Nonparticipant Spillover Kilowatt-Hour Savings Applied to Population	$D \times E$
G	Total Gross Program Evaluated Kilowatt-Hour Savings	Wattsmart Business Evaluation
H	Nonparticipant Spillover as a Percentage of Total Wattsmart Business Evaluated Kilowatt-Hour Savings	$F \div G$

Cost-Effectiveness Methodology

In assessing the Wattsmart Business program’s cost-effectiveness, the Cadmus team analyzed program benefits and costs from five different perspectives (summarized below in Table C-1), using Cadmus’ DSM Portfolio Pro model.⁸ The *California Standard Practice Manual* for assessing DSM program cost-effectiveness describes the benefit/cost ratios for five tests:

- The **PacifiCorp Total Resource Cost (PTRC) test** examines program benefits and costs from RMP and RMP customers’ perspectives (combined). On the benefits side, it includes avoided energy costs, capacity costs, and line losses, plus a 10% adder to reflect non-quantified benefits. On the costs side, it includes costs incurred by both the utility and participants.
- The **Total Resource Cost (TRC) test** also examines program benefits and costs from RMP and RMP customers’ perspectives (combined). On the benefits side, it includes avoided energy costs, capacity costs, and line losses. On the costs side, it includes costs incurred by both the utility and participants.
- The **Utility Cost Test (UCT)** examines program benefits and costs solely from RMP’s perspective. The benefits include avoided energy costs, avoided capacity costs, and avoided line losses. Costs include program administration, implementation, and incentive costs associated with program funding.
- The **Ratepayer Impact Measure (RIM) test** examines program benefits and costs from the perspective of all ratepayers (participants and nonparticipants), who may experience rate increases due to decreased kilowatt-hour sales. The benefits include avoided energy costs, avoided capacity costs, and avoided line losses. Costs include all RMP program costs and decreased revenues.

Because the RIM test measures program impacts on customers’ rates, most energy efficiency programs do not pass the RIM test. Although energy efficiency programs reduce energy delivery costs, they also reduce energy sales. As a result, average rates per energy unit may increase. A RIM benefit/cost ratio greater than 1.0 indicates that rates—as well as costs—will fall due to the program. Typically, this happens only for demand response programs or programs targeting the highest marginal cost hours (when marginal costs exceed rates).

- From the **Participant Cost Test (PCT)** perspective, program benefits include bill reductions and incentives received. Costs include the measure incremental cost (compared to the baseline measures), plus installation costs incurred by the customer.

Table C-1 summarizes the five tests’ components.

⁸ DSM Portfolio Pro has been independently reviewed by various utilities, their consultants, and a number of regulatory bodies, including the Iowa Utility Board, the Public Service Commission of New York, the Colorado Public Utilities Commission, and the Nevada Public Utilities Commission.

Table C-1. Wattsmart Benefits and Costs Included in Various Cost-Effectiveness Tests

Test	Benefits	Costs
PTRC	Present value of avoided energy and capacity costs, ^a with a 10% adder for non-quantified benefits	Program administrative and marketing costs and costs incurred by participants
TRC	Present value of avoided energy and capacity costs ^a	Program administrative and marketing costs and costs incurred by participants
UCT	Present value of avoided energy and capacity costs ^a	Program administrative, marketing, and incentive costs
RIM	Present value of avoided energy and capacity costs ^a	Program administrative, marketing, and incentive costs plus the present value of decreased revenues
PCT	Present value of bill savings and incentives received	Incremental measure and installation costs

^a These tests include avoided line losses.

Table C-2 shows needed cost-effectiveness inputs for each year, all of which RMP provided to the Cadmus team for analysis.

Table C-2. Wattsmart Business Program Selected Cost-Effectiveness Analysis Inputs

Input Description	2021
Discount Rate	6.92%
Commercial Line Loss	10.00%
Industrial Line Loss	5.85%
Irrigation Line Loss	10.21%
Commercial Retail Rate (\$/kWh)	\$0.0850
Industrial Retail Rate (\$/kWh)	\$0.0638
Irrigation Retail Rate (\$/kWh)	\$0.0792
Inflation/Escalation Rate	2.28%

The Wattsmart Business program benefits included energy savings and their associated avoided costs. For the cost-effectiveness analysis, the Cadmus team used this study’s evaluated net energy savings (incorporating freeridership and spillover) and measure lives documented in the program’s tracking data. Table C-3 shows cost-effectiveness inputs for each measure stratum in Wyoming’s Wattsmart Business program.

Table C-3. Wyoming Wattsmart Business Measure Stratum Cost-Effectiveness Inputs

Input Description	Input Value
Average Measure Life ^a	
Energy Management	3.4
HVAC	15.3
Lighting	12.8
Motors	7.0
Oil and Gas	15.5
Other	3.4
Evaluated Net Energy Savings (kWh/year) ^b	
Energy Management	1,953,384
HVAC	1,317,190
Lighting	3,820,733
Motors	13,709,295
Oil and Gas	615,962
Other	1,953,384
Total Utility Cost (including incentives) ^c	
Energy Management	\$127,971
HVAC	\$585,916
Lighting	\$1,001,859
Motors	\$1,517,603
Oil and Gas	\$240,622
Other	\$127,971
Incentives	
Energy Management	\$53,233
HVAC	\$454,728
Lighting	\$625,782
Motors	\$318,490
Oil and Gas	\$114,108
Other	\$53,233

^a Measure stratum effective useful lives are based on individual measure lives and weighted by reported gross savings in the program tracking data.

^b Evaluated net energy savings reflect impacts at the customer meter.

^c RMP provided program costs and incentives in annual report data, allocating program costs by weighted savings.

Energy Management

As shown in Table C-4, the energy management measure stratum proved cost-effective according to all test perspectives except the RIM test.

Table C-4. 2021 Wyoming Energy Management Cost-Effectiveness

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.0346	\$139,150	\$279,592	\$140,442	2.01
TRC	\$0.0346	\$139,150	\$254,175	\$115,025	1.83
UCT	\$0.0319	\$127,971	\$254,175	\$126,204	1.99
RIM	--	\$446,193	\$254,175	(\$192,018)	0.57
PCT	--	\$68,138	\$477,528	\$409,390	7.01
Life-Cycle Revenue Impacts (\$/kWh)					\$0.000020183
Discounted Participant Payback (years)					0.15

HVAC

As shown in Table C-5, the HVAC measure stratum proved cost-effective according to the PCT test perspective.

Table C-5. 2021 Wyoming HVAC Cost-Effectiveness

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.1708	\$1,196,535	\$490,768	(\$705,767)	0.41
TRC	\$0.1708	\$1,196,535	\$446,153	(\$750,382)	0.37
UCT	\$0.0836	\$585,916	\$446,153	(\$139,763)	0.76
RIM	--	\$1,222,195	\$446,153	(\$776,042)	0.37
PCT	--	\$1,675,967	\$1,727,287	\$51,320	1.03
Life-Cycle Revenue Impacts (\$/kWh)					\$0.000006025
Discounted Participant Payback (years)					N/A

Lighting

As shown in Table C-6, the lighting measure stratum proved cost-effective according to the UCT and PCT test perspectives.

Table C-6. 2021 Wyoming Lighting Cost-Effectiveness

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.0604	\$1,483,848	\$1,406,889	(\$76,959)	0.95
TRC	\$0.0604	\$1,483,848	\$1,278,990	(\$204,858)	0.86
UCT	\$0.0408	\$1,001,859	\$1,278,990	\$277,130	1.28
RIM	--	\$3,163,338	\$1,278,990	(\$1,884,348)	0.40
PCT	--	\$1,345,169	\$3,851,870	\$2,506,701	2.86
Life-Cycle Revenue Impacts (\$/kWh)					\$0.000017392
Discounted Participant Payback (years)					3.43

Motors

As shown in Table C-7, the motors measure stratum proved cost-effective according to all test perspectives except the RIM test.

Table C-7. 2021 Wyoming Motors Cost-Effectiveness

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.0510	\$2,143,301	\$2,698,471	\$555,169	1.26
TRC	\$0.0510	\$2,143,301	\$2,453,155	\$309,854	1.14
UCT	\$0.0309	\$1,299,931	\$2,453,155	\$1,153,224	1.89
RIM	--	\$4,150,719	\$2,453,155	(\$1,697,563)	0.59
PCT	--	\$1,421,970	\$3,429,388	\$2,007,417	2.41
Life-Cycle Revenue Impacts (\$/kWh)					\$0.000013179
Discounted Participant Payback (years)					3.39

Oil and Gas

As shown in Table C-8, the oil and gas measure stratum proved cost-effective according to all test perspectives except the RIM test.

Table C-8. 2021 Wyoming Oil and Gas Cost-Effectiveness

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.0298	\$2,395,492	\$4,485,835	\$2,090,342	1.87
TRC	\$0.0298	\$2,395,492	\$4,078,031	\$1,682,539	1.70
UCT	\$0.0189	\$1,517,603	\$4,078,031	\$2,560,429	2.69
RIM	--	\$6,898,287	\$4,078,031	(\$2,820,256)	0.59
PCT	--	\$1,196,379	\$5,699,174	\$4,502,795	4.76
Life-Cycle Revenue Impacts (\$/kWh)					\$0.000058417
Discounted Participant Payback (years)					0.98

Other

As shown in Table C-9, the “other” measure stratum proved cost-effective according to the UCT perspective.

Table C-9. 2021 Wyoming Other Cost-Effectiveness

Cost-Effectiveness Test	Levelized \$/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
PTRC (TRC + 10% Conservation Adder)	\$0.1260	\$825,543	\$473,284	(\$352,259)	0.57
TRC	\$0.1260	\$825,543	\$430,258	(\$395,285)	0.52
UCT	\$0.0367	\$240,622	\$430,258	\$189,637	1.79
RIM	--	\$799,298	\$430,258	(\$369,040)	0.54
PCT	--	\$699,029	\$672,784	(\$26,245)	0.96
Life-Cycle Revenue Impacts (\$/kWh)					\$0.000002865
Discounted Participant Payback (years)					15.99